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HANDLING OF CREAM AND MAKING OF BUTTER ON THE FARM

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There is a growing demand for instruction in handling cream on the farm. This interest is manifested not alone by those who desire to know how to make good dairy butter, but by a large number of milk producers, who find it more convenient and profitable to sell the cream. This circular is written with the thought of aiding the makers of dairy butter, by presenting more specific directions for carrying on such work.

Dairymen are beginning to realize that butter of good quality cannot be made from cream produced under unsanitary conditions. If the natural, sweet, rich flavor of cream has been destroyed by carelessness and neglect, it will be noticeable in the finished butter. There are a few dairymen who care very little about the condition of their cream or butter, as long as it can be disposed of, not realizing that by carelessness, they are doing an irreparable injustice to their more painstaking neighbors.

First, it is important that such management be given the herd that the result will be clean milk from healthy cows.

Care of Utensils

Dairy utensils should be made of the best grade of tin and never used for any other purpose. Wooden or galvanized pails are objectionable. See that all joints in the pails, cans, and strainers are well made and filled with solder. Cans with the tin partly worn off are not suitable receptacles for milk and cream because they rust and this condition imparts a metallic flavor to the butter. Utensils that come in contact with milk or cream can best be cleaned by first rinsing with cold water and then washing with a brush and hot water. Washing powder suitable for use in the dairy should contain no grease. Ordinary sal-soda used in small amounts is also a good dairy cleanser. After washing the utensils with hot water, rinse thoroly with boiling water and place them where they will come in contact with the direct rays of the sun. In washing the ordinary five, eight, or ten-gallon milk cans, be sure that the inside of the shoulder of the can is rubbed with the brush, as this is the most difficult part to clean.

Utensils scalded with boiling water and left in contact with it long enough to be thoroly heated need not be dried with a cloth. Simply place them where they will drain and be exposed to the sun.

Skimming the Milk

The old methods of putting milk in shallow pans in a cool place, or in deep cans in a tank of cold water, are still in use, but not all the cream is recovered by these methods. However, these are more satisfactory than the so-called water separator, which is nothing but a fraud—a piece of apparatus deceiving to the users. The same results could be obtained with the ordinary cans used in the deep-setting system by filling them one-third to one-half full of water and filling with milk, then removing the cream in the usual manner. By this hydraulic or water separator, from one-fifth to one-fourth of the butter fat is lost, skim milk of low feeding value is obtained, and the cream is thin and often contaminated with all the impurities of the water. The cream will have a watery flavor which leaves its effect in the butter. The most satisfactory method of obtaining cream from milk on the farm is by the use of a standard make of hand separator. The cost of such a machine may seem high, but when the amount of butter fat is compared with the butter fat obtained from the same milk by other methods, one can easily figure how long it will take to save the cost of the machine.

There are several makes of hand separators on the market. The principle upon which they do their work is practically the same, but there is a difference in their efficiency and durability. If the farmer has a preference for a certain make of machine, and is satisfied that it is durable and will do good work, that is the separator for him to buy, but the man who has no preference, who simply wants a good machine, should not accept one that has not been thoroly tested.

If the separator is put in and operated, capacity tested, and the skim milk tested for butter fat by the agent or salesman, be sure the machine is not turned faster than the number of revolutions indicated on the handle or stated in the book of instructions. There are machines that will not do close skimming at regulation speed, but will do very efficient work at a greatly increased speed, and this means greater wearing of the running parts and more work for the operator.

General instructions for the care and handling of the hand separator are: Set the machine perfectly level on a solid floor; be sure that no dirt or grit has found its way into the gearing; clean all parts thoroly before using; all the parts that come in contact with the milk should be thoroly scalded; oil the separator each time it is used with only the best grade of separator oil; once a month remove all gearing guards and examine to see if everything is working properly. If at this time it seems advisable to thoroly clean all bearings and gearing parts, kerosene applied, wiped off, and replaced by oil will materially lengthen the life of the separator. If by accident some milk should get into any portion of the separator, clean it out, as it will soon clog the gearings and give an offensive odor to the room. Look occasionally to see if the machine is standing level. Do not think that the separator is a difficult piece of machinery to handle and that it is hard to take care of. Follow the directions given in the book of instructions pertaining to your make of machine. Clean the separator each time after using, as once a day is not sufficient, and this is best done immediately after it has been used. Take it apart, rinse well with cold water, and then wash all parts of the bowl and tinware in warm water, using the brushes that belong to the separator. Never use a dish cloth or soap of any kind, but rather small quantities of sal-soda or washing powder free from grease. After all parts are thoroly washed, rinse in boiling water and place in the sun. Even the brushes used in washing

should be scalded and placed in the sun. During the night leave all parts in the supply can without putting them together.

It is best to skim the milk immediately after milking, or while it is still warm. Most separators do their best work with the milk at a temperature of from 85° to 95° F.

See that the machine is operated at full speed and at full capacity. If turned by hand, see that the speed is uniform and evenly applied. Do not simply push when the handle goes down and pull when it starts up, as this is hard on the separator. Prior to turning on the milk supply and just after separating is completed, it is well to run a quart of water thru the bowl. The common practice is to stop turning and then pour in the warm water, but the speed should be increased while flushing the bowl. Allow the bowl to come to a standstill of its own accord unless there is a brake attached.

The relative amount of cream to be obtained from the amount of milk skimmed will depend upon the breed of cows, the season of the year, and whether the cows are fresh or advanced in the period of lactation. The percent of fat in cream varies as the season advances, because the milk does not test the same thruout the year. Other conditions being the same, the richest milk is produced on dry feed and toward the end of the lactation period.

It is best to skim a cream that will test from 30 to 40, or, in other words, in skimming ten gallons of milk, one or one and one-third gallons of cream should be obtained. It is not the amount of cream that is important, but the amount of butter fat. If the cream is sold to a creamery where sampling for testing is done by weighing instead of measuring, the correct test will be obtained whether the cream be thick or thin. Cream testing between 30 and 40 means more skim milk left at home. Higher testing cream keeps better, and naturally there is less to transport. If a certain amount of cream is churned at home and an equal amount sent to the creamery, the number of pounds of butter obtained will be a trifle more than the butter fat figured from the test of the cream at the creamery, simply because the test determines the amount of butter fat, and, as a rule, under dairy conditions six to six and one-fourth pounds of butter fat will make seven pounds of butter.

When a separator is set to skim a 40 percent cream, it does not mean that every can of cream obtained will test 40 percent, for the percent of fat in the cream varies with the speed of the

machine, temperature of the milk, amount of milk going into the bowl, amount of water used in flushing the bowl, and, as stated above, variation in the test of the milk.

Care of Cream

As soon as the cream is separated, it should be cooled to the temperature of the well water. Stir occasionally while cooling in a loosely covered can. Never mix warm cream with cold, but cool each skimming before mixing with the cream already on hand.

Deliver the cream at least three or four times a week in summer and two or three times a week in winter. Do not think because it is sweet that it is in good condition and need not be delivered.

The best cream is usually received when the farmer delivers it himself, and when each farmer's cream is delivered at the creamery or shipping station in separate cans. During transportation the cans should be protected with a cover, a wet blanket in summer and a dry one in winter. If the cream is gathered by a cream hauler and your cream is mixed with your neighbors', see that it is thoroly stirred before a small sample is taken for testing.

Most farmers would deliver a better grade of cream if they had a suitable place for keeping it until it is delivered. No one should attempt to keep the cream in the cellar or in a large tank of water where the daily pumping is not sufficient to keep it cool. If a suitable place cannot be built in a well-constructed milk house, the following arrangement answers the purpose quite well.

Caring for the cream at the proper time by any of the methods given below will result in very little souring at the end of two days.

Make a small water-tight box of two-inch material and of sufficient size to hold all the cream cans necessary in handling the cream. This box should have a tight fitting cover, and be divided into sections by means of rods which will prevent single cans from upsetting when left alone in the tank. The best place for this tank is in the milk house. It may be placed between the well pump and the stock watering tank, and in that case another box or small house should be built over it for protection. All the water pumped for the stock should flow through this tank, the inlet discharging near the bottom, which will force all the warm

water out first. The overflow pipe should have one-half inch larger diameter than the inlet in order that the water may be freely carried off. The water in the tank should be of sufficient depth to immerse the cans within two inches of the top. Another place that would be suitable for holding cream could be built inside the watering tank, or an ordinary empty kerosene barrel may answer the purpose. Burn out the oil and bore holes for the water inlet and outlet between the second and third hoops from the top. Make connections the same as for the box, but be sure the inlet water pipe is extended nearly to the bottom. It is a good plan to bore one-inch holes between the first and second hoops from the top and place rods through them, so the cans will not float when partly filled. Shelter this barrel the same as you would the box, remembering to change the water in the box or barrel often enough to have it reasonably cold, so that the cream may be kept at nearly the same temperature as the water from the well.

Ripening the Cream for Making Butter

The difficulties and problems involved in the handling of cream for making butter are so numerous and complex, it is little wonder there is a lack of uniformity in the product. The trouble may be due to some one or more of the following causes: Improper handling of the milk before it is skimmed; using the utensils, such as pails, strainers and cans, for other purposes, and not cleaning them thoroly before they are again used as receptacles for milk or cream; allowing the cream to stand in a warm, ill-ventilated room where it becomes tainted and acquires an off-flavor or becomes too sour.

It is out of the question to make the best grade of butter out of cream that has an off-flavor or is in any way tainted. Do not think because there is a small amount of cream it is not necessary to churn more than once a week, but aim to churn at least twice a week. On a number of farms where butter is made the churning days are Tuesday, Friday, and market day Saturday. It is not essential to follow this rule, but in order to secure a uniform grade of butter it is necessary to churn at least every third or fourth day.

The cold cream, when warmed by additional lots of fresh, warm cream, will sour quickly, and during the collecting period it should be kept as cold as possible with well water. Each new

lot of cream should be cooled to that temperature before it is mixed with that previously saved. The following suggestion has been tried and found to work well: For holding the cream have a regular can fitted with a cover through which the handle of the stirrer may project. The second can should be smaller, but of sufficient size to hold all the cream of one skimming. Cool the cream in this can before pouring it into the large can, and it is a good plan to leave the cream in this until the following milking time; but the cooling should begin as soon as the separating is completed, in order to check souring. Stir the cream occasionally while it is cooling. Twenty-four hours before the time for churning, the cream can should be placed where the cream will warm to from 60 to 65 degrees, in summer, and 70 to 75 degrees in winter. Add the starter, using from one to two and a half gallons for every ten gallons of cream. In case the cream has not been kept cold enough to remain sweet, it will not be necessary to warm it for souring. After the starter is added the cream should be thoroly stirred every hour until it has taken on a sufficient amount of acid for churning. This can be determined by an acid test or by the general appearance. It should be smooth and glossy with a clean acid flavor and aroma. Under favorable conditions, this development of acid is brought about in from six to eight hours. The cream should then be cooled to churning temperature and held for at least two hours in winter and from four to six hours in summer; otherwise, the butter will come soft and mushy with a correspondingly increased loss in the buttermilk.

The following method has been used with success: At the beginning of collecting period or when the first amount of cream is placed in the cream can, a small amount of starter is added to it, usually one-fourth of the amount of cream; in this case the development of acid is going on slowly during the time the cream is collected. No fresh cream should be added later than twelve hours before churning. If the cream is kept cold enough to check an over development of acid, the above method is satisfactory.

Frequently the maker of dairy butter experiences difficulty in completing churning in the proper length of time. This is usually due to a viscous condition of the cream, caused by using milk from cows that are nearly dry; churning cream that is too thin or too rich in butter fat, at abnormal temperatures; over-

crowding the capacity of the churn and churning the cream from the milk of one cow.

The value of the starters in making butter cannot be overestimated, either on the farm or in the well-equipped creamery. While butter can be made from sweet cream, it will not have the same flavor as butter made from sour cream. Souring of cream is most successful when controlled by means of a clean flavored sour skim milk, or whole milk starter.

Starter

To make the starter, whole milk or skim milk may be used, but the latter is preferable because the top of the starter must be thrown away. Take a certain amount of either, depending on the amount of cream to be churned (2 to 3 gallons to every 10 gallons of cream). Place this milk in a covered vessel where it can be kept at a temperature of 70 degrees or even 85, if it is desired that it should sour in a shorter period. At 70 degrees, as a rule, it takes from 18 to 24 hours for it to become thick. When the starter is sour, it is ready to be added to the cream, but first discard an inch from the top. A smooth, glossy appearance with a clean milk acid taste and aroma indicates a good starter. Stir this well and add to the cream. It is sometimes impossible to obtain a good starter from the mixed milk of the herd. This is especially true in the fall or when a number of cows are going dry. In that case better results can be obtained by using a commercial starter or by selecting several samples of milk in perfectly clean quart jars and allowing it to sour. Select the one that shows the most solid curd and the cleanest flavor for your starter. Mix this with the desired amount of selected whole milk taken from a cow that is giving the most milk or from one that was recently fresh, and allow this to stand at a favorable temperature for a short time, or until it is sour enough to use in the cream.

As has already been stated, use from two to three gallons of starter to ten gallons of cream. If the cream for churning has been obtained by setting the milk in shallow pans or in the ordinary shot gun or Cooley cans it is usually thinner than the cream obtained by the use of the hand separator, and not more than one gallon of starter can be used to ten gallons of cream. Best results can be obtained by churning cream that contains enough butter fat to produce about two and one-half pounds of butter per gallon of cream after the starter is added, or twenty-eight per cent cream.

Churning

When the cream has been held at churning temperature for a period of two to three hours, it is ready to be churned. This temperature should vary with the season (summer 52–54° F.; winter 58–62° F.), lactation periods of cows, kind of feed the cows are consuming, and amount of butter churned per gallon of cream. Do not fill the churn over one-third full, because if more cream than this is put in the churn it will lengthen the churning period. The usual time required for churning is about 30 minutes. The speed of the churn should be uniform and fast enough to give the greatest concussion.

Churning should cease when the granules are fairly uniform in size, and have the appearance of cracked corn. There is greater danger in over-churning than under-churning. Draw the buttermilk through a strainer.

Washing the Butter

When the buttermilk has thoroly drained, sprinkle cold water over the butter, without revolving the churn, until the water comes out quite clear. Close this outlet and add fully as much water as there was cream in the churn, twice as much will do no harm. Close the cover, and revolve the churn about twenty times and at the same speed as for churning. Allow the water to drain out thoroly. The temperature of the wash water and the buttermilk should be about the same. It may be necessary to have the wash water warmer than the buttermilk in winter and colder in summer. The butter when ready to be worked must not be too soft or too firm.

Salting the Butter

When the last wash water has drained off, sprinkle the salt solution over the surface of the granular butter. The amount to use should be regulated by the demand of the consumers. As a standard the following method will produce desirable results: To every ten pounds of butter in the churn, mix one pound of dairy salt and two pounds of water. The salt and the water should be mixed at least thirty minutes before it is sprinkled on the butter. Close the cover tightly and revolve the churn slowly about ten times. The butter should then be allowed to remain in the churn with the salt solution about fifteen minutes before it is worked. If by this method of salting the desired results are not

obtained, vary the proportion of salt and water. A certain amount of water must be present in the churn with the salt, as otherwise it will not dissolve, incurring a greater danger of streaked or uneven coloring.

Estimate the amount of butter in the churn by the weight of butter in the previous churning.

Working the Butter

For a large dairy the combined churn and worker is preferable, while in the smaller, the "V" shaped lever, or square shaped roller workers give splendid satisfaction. The butter can be worked in a butter bowl by means of a ladle, but it is difficult and tiresome.

Working should be accomplished by pressure only, the sliding of the ladle or lever over the surface of the butter will make it salvy or greasy. When the lever or roller has passed over the surface of the butter once, turn the outer edge toward the center and on top of the middle portion of the butter. Repeat this operation until the working is completed. Worked butter should be compact, of uniform grain, and the salt evenly distributed and dissolved.

A number of dairy buttermakers think that it is necessary to partly work the butter and then allow it to stand for several hours before finishing. This need not be done if the granular butter, salt and water in the churn have been thoroly mixed and the salt has partly dissolved before the working was begun.

The Package of Butter

Put the butter on the market or deliver it to the regular customers in a package that is neat and attractive. The country roll is a thing of the past. No one can stake their reputation for quality on that form of package. The one pound block print is probably the most popular package. The name of the maker stamped in the surface of the butter or printed on the outside of the carton or wrapper signifies "Quality." Aside from one pound prints, pack the butter in jars or standard fibre packages.